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ELECTROPHOTOGRAPHIC PROCESSING TECHNIQUES

CONTRACT NO. [REDACTED] TASK ORDER NO. 03(100,762)65-R

Monthly Narrative Report - November 1965

This is the fifth of a series of monthly narrative reports on a study of electrophotographic processing techniques. The study comprises the investigation and development of electrical-chemical and electronic techniques for processing photographic images so as to improve their perceptibility to human observers.

This report covers the work performed by the [REDACTED] during the period from 22 October to 22 November 1965.

The key to the electrical-chemical processing is control of acutance and granularity in processed transparencies by adjustment of density thresholds, expansion and contraction of densities, and application of modulated-light contact printing. The key to the electronic processing, both analogous and complementary to the electrical-chemical processing, is separate and simultaneous operation on the high and low frequency information in the photographic images.

A. Current Status of Work

1. Electrical-Chemical Processing

The micro-copier camera was received and installed in the photographic laboratory. Equipment calibration, including the measurement of copy film characteristics, was begun. However, final delivery of parts (e.g., lens holders and an illuminator support bracket) is expected for the start of the next monthly period.

Declass Review by NGA.

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Four films selected for use with the [redacted] (optical) contact printer: SO 3404, SO 5427, SO 2427, and Gravure, were programmed for several exposure gradients; chemical processing was in accordance with the manufacturer's recommendations. The data will be employed in the actual processing experiments.

The breadboard modulated-light (electrical) contact printer was completed and delivered to the photographic laboratory at the end of the monthly period. This equipment incorporates techniques common to both the electrical-chemical and electronic processing divisions of the program.

2. Electronic Processing

The design and construction of a high-pass filter, a low-pass filter, and a mixer, electronic components for the feedback loop of the breadboard electronic processing system, were completed. They were installed in the system at the end of the monthly period.

The entire breadboard system was reviewed to find a solution to the problem of obtaining light uniformity over the transparencies to be processed. As a result, a pair of glass condensers was ordered to replace the Fresnel lens in front of the multiplier phototube. The effects on performance of this modification to the system will be determined from experiments to be performed at the start of the next monthly period.

Upon the approval of the Technical Representative, an order was placed for a special deflection yoke driver [redacted]

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[redacted] This new dual-driver for producing box-type scanning will be received early in January 1966.

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B. Problem Areas Encountered

No critical problem areas were encountered during the monthly period.

C. Projected Work for Next Monthly Period

1. Electrical-Chemical Processing

- a. Complete calibration of the micro-copier camera, including measurement of film characteristics.
- b. Perform calibration of the modulated-light contact printer, including measurement of film characteristics.
- c. Perform overall system integration.
- d. Prepare test targets for initial processing experiments.
- e. Begin preliminary processing experiments.

2. Electronic Processing

- a. Incorporate the new filters, mixer, and glass condensers into the breadboard processing system.
- b. Perform processing experiments with the modified system.
- c. Continue investigation and design of electronic filters for the system feedback loop.
- d. Continue investigation and evaluation of additional electronic techniques for relevance to the overall program objectives.

D. Status of Fund Expenditures to End of Monthly Period

Funds expended at break-even level to 28 November 1965:

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E. Documentation of Verbal Commitments and/or Agreements
During the Period

1. A transparency incorporating simple geometrical shapes (of varying size and density), a density step wedge, and a selected area of a scene chip will be prepared by project personnel. This composite image will then be reproduced in several, separately degraded states (representing known degrees of defocus, overexposure, and smear or motion) to provide a set of test targets for initial processing experiments.

2. A preliminary analysis of the electrical-chemical and electronic processing techniques, stressing those characteristics related to the usefulness and ultimate practicality of these techniques, should be performed by project personnel as soon as possible.